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ABSTRACT

Feelings of medical technology graduates about their jobs were studied using the descriptive survey research method. Attention was directed to the relationship of job attitudes to time since graduation, presence/absence of professional development activities, and selected characteristics of the respondents. Questionnaire responses from 186 graduates of the Illinois State University medical technology program were analyzed using several statistical techniques. Results of factor analysis suggest that professional development opportunities are not systematically related to job satisfaction. Regression analysis results include the following: (1) when controlling for gender and degree, the relationship between job satisfaction and time was curvilinear (i.e., after an initial period of satisfaction with the work, job satisfaction begins to decline); (2) controlling for time and gender, graduates with a baccalaureate degree only experienced less job satisfaction than those with higher degrees; and (3) when controlling time and degree, males experienced greater job satisfaction than did females. Questionnaire items and factor loading data are included. (SW)

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STATISTICAL ANALYSIS OF THE IMPACT OF SELECTED VARIABLES ON THE JOB SATISFACTION OF MEDICAL TECHNOLOGISTS

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STATISTICAL ANALYSIS OF THE IMPACT OF SELECTED VARIABLES ON THE JOB SATISFACTION OF MEDICAL TECHNOLOGISTS

ABSTRACT

This is a study, using the descriptive survey method of research, to assess how the graduates of a medical technology program feel about their jobs. The data were statistically analyzed in three phases. Phase I consisted of a factor analysis with two factors emerging: "Job Satisfaction" and "Professional Development Opportunities". Phase II was an examination of the relationship between job satisfaction (JS) and the length of time (TIME) since graduation. Phase III analyzed which selected characteristics were significantly related to job satisfaction. The results of the factor analysis in Phase I suggest that professional development opportunities are not systematically related to job satisfaction. The Phase II analysis results show a curvilinear relationship between TIME and JS. The Phase III analysis yielded a relationship between job satisfaction and (1) time, (2) levels of formal education, and (3) gender.

INTRODUCTION

The issue of job satisfaction has received increasing attention over the last several years. It has become a major subject of concern among employers, educators, and professionals. Educators are concerned about a decline in the number of applicants for educational programs, employers are concerned about being able to continue staffing laboratories with certified professionals, and the professionals are concerned about the trend that has seen some of their most talented peers leave the field. Data that suggest that schools cannot provide enough graduates to meet new demands and to replace losses through attrition, coupled with the opinions of educators that applications to schools of medical technology are declining, further establish the notion of a technologists shortage that may worsen. This study attempts to refine the relationships of job satisfaction with time since graduation, presence/absence of professional development activities, and selected background characteristics of medical technologists. Several studies related to job satisfaction among laboratory workers have been integrated with the present findings.

MATERIALS AND METHODS

The subjects in this study were graduates of the medical technology program at Illinois State University from 1972 through 1982. The descriptive survey method of research was used to gather the data and to describe the ratings of the graduates concerning particular items that refer to job satisfaction and professional development opportunities. The following procedure was used to obtain the data: (1) a 39 item closed form questionnaire was developed; (2) the questionnaire was fielded tested on selected faculty

members (certified medical technologists by the American Society of Clinical Pathologists) of Illinois State University; (3) the instrument was revised incorporating the recommendations of the faculty members; (4) the questionnaires were mailed to the participants; (5) both follow-up letters were sent and telephone calls were made to the participants who had not responded to the questionnaire; and (6) data were recorded and computer analyzed in three phases. (The questionnaire is shown in Figure 1).

Phase I consisted of a factor analysis of the items in the questionnaire. Phase II was an examination of the relationship between job satisfaction (JS) and length of time (TIME) since graduation. For this analysis, derived factor scores for job satisfaction were regressed on TIME. The quadratic term, TIME * TIME = TIMESQ was introduced which yielded a multiple R which was statistically significant. In Phase II several background factors -- (1) years in present position, (2) gender, (3) marital status, (4) full-time/part-time employment, (5) TIME, and (6) TIMESQ -- were studied to determine which were significantly related to job satisfaction. The factor scores for job satisfaction were then regressed on the entire set of independent variables, and a step-wise procedure was used to eliminate any variables which did not provide a statistically significant independent effect.

RESULTS

Of 319 graduates, 15 could not be located and were not mailed questionnaires. Three hundred and four questionnaires were mailed, and 226 (74 percent) were returned. Table I shows the number of graduates, and the year of graduation of the population. For the purpose of this study only the 186 respondents who were currently employed in the field of clinical laboratory

sciences were used. In Phase I, the responses were analyzed by using a principal component analysis with varimax rotation. Based on the scree test, two factors were identified: (1) Job Satisfaction, and (2) Professional Development Opportunities. These factors accounted for 46 percent of the common variation. Rotated factor loading greater than .40 are shown in TABLE II.

It should be recalled that factors are hypothetical constructs and labeling them is a subjective process. Typically, labels are assigned by examining the correlations (or factor loadings) of each original variable with the factors. For example, the first item in TABLE II "My job provides me with a sense of accomplishment" has a loading of .78 on Factor 1, "Job Satisfaction"; that is, it correlates .78 with Factor 1. Examination of the remaining items in TABLE II which load on Factor 1 indicate that they represent many of the components related to job satisfaction, i.e. a challenging job, feeling that one's work is appreciated, professional respect, job responsibility, salary, and commitment. Thus, the label "Job Satisfaction" was assigned to the first factor. Similarly, the items which loaded on Factor 2 represent constructs which are typically associated with professional development, i.e. opportunities for innovation and involvement in decision making, new skill development, additional education and training, and opportunities for advancement.

In the Phase II analysis, the relationship between job satisfaction (JS) and length of time (TIME) since graduation was examined. When factor scores were regressed on TIME, the correlation, while positive, was not statistically significant (.05 level). Inclusion of the quadratic term, TIME * TIME = TIMESQ, yielded a multiple R of .25 which was statistically significant (F=6.32; df=2,183;

$p < .01$). The resultant equation for estimating mean job satisfaction scores over time is:

$$EST\ JS = -.560 + .322\ (TIME) - .0318(TIMESQ).$$

The equation is plotted in Figure 2. The results show a curvilinear relationship between TIME and JS; that is, it can be observed that the mean job satisfaction scores increase from the time of graduation until a maximum of 5.1 years. From that point, job satisfaction begins to decrease. Since the maximum time since graduation in this study is 11 years, it would not be appropriate to extrapolate the results beyond that point. While there is no evidence in this study to explain why the phenomenon occurs, several reasons are postulated in the discussion.

The regression results for the significant predictors of job satisfaction are shown in TABLE III. These statistically significant variables were defined as follow;

DEGREE = 1 if person has a baccalaureate degree
= 0 if person has education beyond the baccalaureate

GENDER = 1 if female
= 0 if male

TIME = number of years since graduation

TIMESQ = (TIME) * (TIME)

The regression analysis results can be summarized as follow:

1. When controlling for GENDER and DEGREE, the relationship between job satisfaction and TIME is non-linear.
2. When controlling for TIME and GENDER, graduates with a baccalaureate degree only, experienced less job satisfaction than those

with formal education beyond the baccalaureate degree.

3. When controlling TIME and DEGREE, males experience greater job satisfaction than females.

DISCUSSION

Since factors resulting from a principal components analysis with varimax rotation produce uncorrelated factors, a curious result of the factor analysis in Phase I is the suggestion that professional development opportunities are not systematically related to job satisfaction. That is, the presence of such opportunities will not necessarily increase job satisfaction. It has been noted by Myer, Bronstein, and Vojir[1] in their study, "Why are Medical Technologists Dissatisfied?", that of 175 medical technologists, the dissatisfied group (46 percent) stated that "opportunity for professional growth" did not contribute at all to their job satisfaction. Another study by Broska, Manuselis, Noga[2] identifies "limited upward mobility" as a condition which contributes to dissatisfaction. This study indicates that the presence of professional development opportunities will not necessarily lead to an overall increase in job satisfaction. Rather, the effect of providing professional development opportunities appears idiosyncratic, depending perhaps on each persons professional goals.

While there is no evidence in this study to explain the curvilinear relationship between time and job satisfaction, several reasons may be postulated. While new college graduates generally experience a sense of excitement about their first job, this excitement may soon be tempered by the reality of starting at the "bottom of the ladder." However, as they gain experience they take on additional responsibilities, work more

independently, gain the respect of their co-workers and feel a sense of accomplishment. But this period of personal growth is finite due to the nature of the work. Sooner or later routines are developed and the work becomes repetitive, perhaps even boring, and job satisfaction begins to decline.

The findings in this study are consistent with those of Myer, Bronstein and Vojir[1]. In their study, the following consistencies are noted. They reported that in their study of 175 medical technologists: (1) medical technologists in the most dissatisfied category tended to be less experienced than two other groups. This group corresponds to the group in this study who had been graduated for less than five years. (2) Medical technologists in the most dissatisfied category included those who had been in the profession for more than seven years. This group corresponds to the group in this study who had been graduated for more than five years. The authors further note that:

> The overall pattern for the most dissatisfied group suggests that many of these individuals have reached a plateau. Most have been in the profession for about ten years and the work may no longer offer a challenge.

If the above scenario and the findings of other investigators are reasonably accurate, then efforts need to be focused on ways to keep the environment stimulating. Support for such a focus is provided by French[3] who has noted in her book, the Dynamics of Health Care, that medical technologists experience education and training that produce an "Ideal Self" and then experience a work environment in which that ideal can never become a reality. And, direction for such a focus is provided by Matteson,

Ivancevich, and McMahon[4] who have concluded that medical technologists prefer supportive, well-structured environments, that provide opportunities for them, through participation, to maintain a degree of control over their work setting.

The Phase III analysis data indicate that when controlling for time and gender, those medical technologists with the least amount of formal education (baccalaureate degree only), experienced less job satisfaction. Perhaps job satisfaction is related to the individual's personality and ambition. French and Rezler[5] have noted in their study "Personality and Job Satisfaction of Medical Technologists" that the more intuitive persons seem to find a better outlet for their talents in education and administration since their interests are more intellectual and theoretical. These authors also noted that previous research has shown that people who prefer intuition to sensing tend to score higher on measures of academic aptitude and verbal intelligence tests, hence, finding their way into teaching or supervisory positions. Additionally, French and Rezler reported that medical technologists functioning as laboratory personnel were less satisfied with their work in general, with their co-workers, and with their opportunities for advancement than were medical technologists who were educators or administrators. Could it be that persons with this type personality attain more formal education and experience a higher rate of job satisfaction? Additional research should help resolve the issues.

The findings of this study imply a need for future studies. Additional studies should be replicated in other regions of the country to provide a basis for generalizing the results. Longitudinal studies might be done to

measure possible value changes as students move from course work to actual work settings. The measurements of interpersonal values should prove valuable in both recruitment and staff development processes.

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3. French RM: Dynamics of Health Care. New York, McGraw Hill, 1979.
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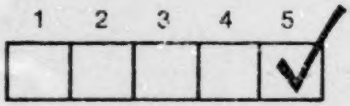
For items 1-17 indicate your response by making a check mark in the square that best relates your opinion about each statement. The numbers associated with the five responses are:

5 = always true
4 = frequently true
3 = somewhat true
2 = seldom true
1 = never true

Example: My job provides self satisfaction.



(always true)

1. My job requires me to think.
2. My work entails variety.
3. My job allows me to be creative.
4. My job provides me with a sense of personal independence.
5. I feel that my work is appreciated.
6. I have opportunities to develop new methodologies and procedures.
7. I am encouraged to develop additional skills.
8. I have opportunities to be involved when decisions are made in the laboratory.
9. I feel that I am respected as a professional by my coworkers.
10. I feel that I am respected as a professional by other health care workers who are not medical technologists.
11. I am given enough responsibility for my present position.
12. My job provides me with a sense of accomplishment.
13. I am able to attend workshops, seminars, and lectures on employer's time and expense.
14. My job provides me with the opportunity to prepare for future advancement in the hospital.
15. I feel I am paid a fair salary commensurate with my educational background and ability.
16. I regard my present position as a lifetime career.
17. If I could start over, I would choose a different line of work.

Fig. 1. Questions in questionnaire mailed to graduates of Illinois State University.

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Table I

Medical Technology Graduates By Years
At Illinois State University

Years of Graduation	Number of Graduates	Number of Returns	Percent of Returns
1972	20	3	15
1973	20	5	25
1974	21	17	80
1975	24	24	100
1976	28	25	89
1977	38	24	63
1978	39	26	66
1979	33	26	78
1980	36	32	88
1981	33	24	72
1982	27	20	74
TOTAL	319* (319 - 15 = 304)	226	74

*Fifteen Graduates could not be located and were not mailed questionnaires.

TABLE II

Factor Leadings Greater Than .40 for Factor I "Job Satisfaction" and Factor 2 "Professional Development Activities"

Item	Factor 1 Job Satisfaction	Factor 2 Professional Development Opportunities
My job provides me with a sense of accomplishment.	.78	*
My job requires me to think.	.56	*
My job entails variety.	.56	*
My job provides me with a sense of personal independence.	.68	*
I feel my work is appreciated.	.60	*
I feel I am respected as a professional by my coworkers.	.53	*
I feel I am respected as a professional by other health care workers who are not medical technologists.	.49	*
I am given enough responsibility for my present position.	.53	*
I feel I am paid a fair salary.	.48	*
I regard my present position as a lifetime career.	.50	*
If I could start over, I would choose the same line of work.	.63	*
I have opportunities to develop new methodologies and procedures.	*	.80
My job allows me to be creative.	*	.66
I have opportunities to be involved when decisions are made in the laboratory.	*	.77
I am encouraged to develop new skills.	*	.71
I am able to attend workshops, seminars, and lectures on employer's time and expense.	*	.75
My job provides me with the opportunity for future advancement	*	.60

* Indicates factor loading was less than .40.

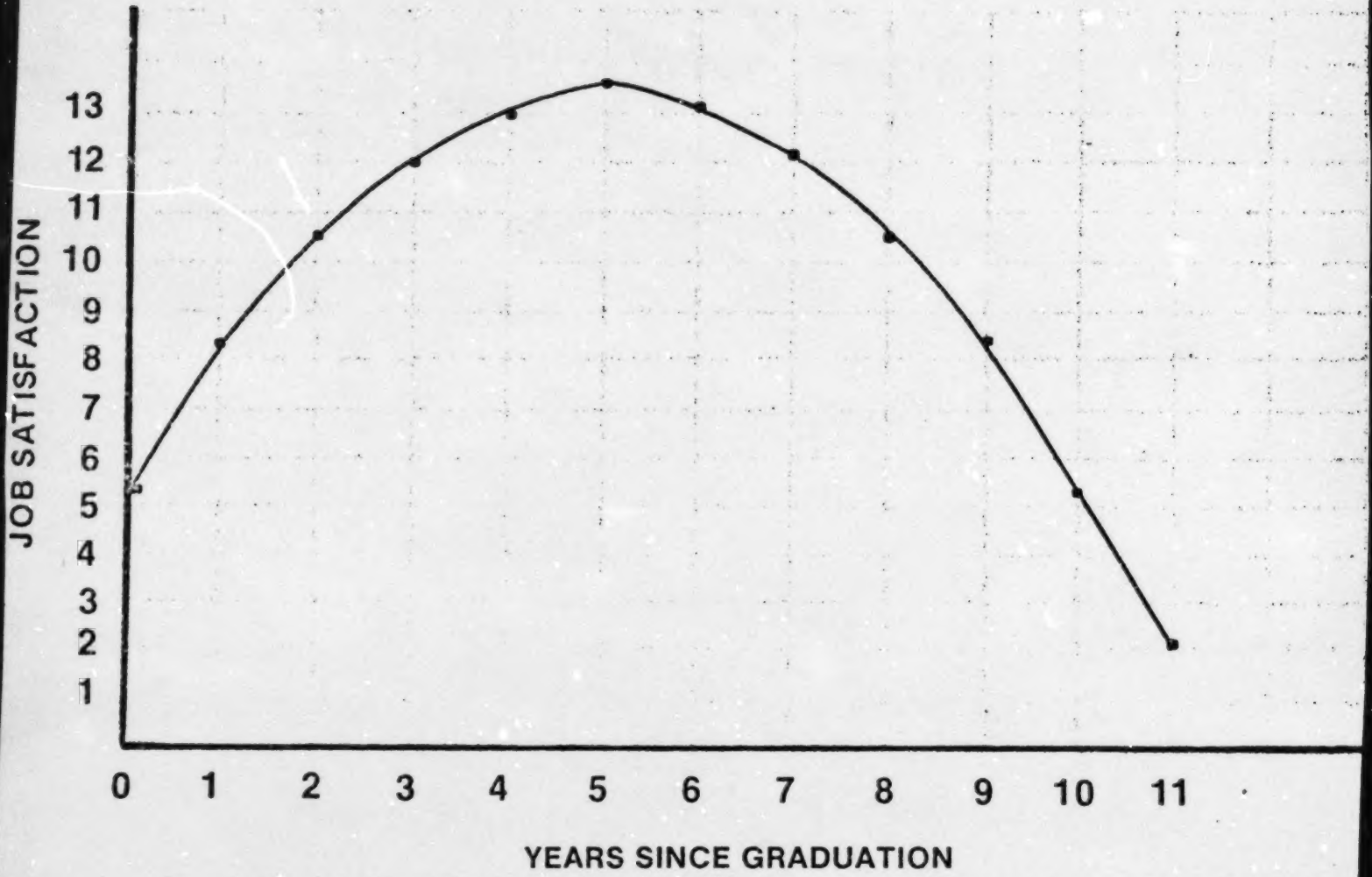

Fig. 2 Correlation of mean job satisfaction scores and years since graduation.

TABLE III

Regression Results for Significant Predictors of Job Satisfaction

Variable	Beta	t	Multiple R
TIME	1.06	2.87**	.387*
TIMESQ	-1.14	-3.09**	
DEGREE	-0.14	-1.97*	
GENDER	-0.23	-3.28**	

*$p < .05$
**$p < .01$